

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it contains a valid OMB control number.

#9/RCE

**Request
for
Continued Examination (RCE)
Transmittal**

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<i>Application Number</i>	09/955,722
<i>Filing Date</i>	09/18/2001
<i>First Named Inventor</i>	Peterson
<i>Art Unit</i>	2815
<i>Examiner Name</i>	Eugene Lee
<i>Attorney Docket Number</i>	SD-6436.1

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).
 - a. Previously submitted, if a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
 - i. Consider the arguments in the Appeal Brief or Rely Brief previously filed on 08/12/2003
 - ii. Other _____
 - b. Enclosed
 - i. Amendment/Reply
 - ii. Affidavit(s)/Declaration(s)
2. **Miscellaneous**
 - a. Suspension of action on the above-identified application is requested under 37 CFR 1.103(e) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(f) required)
 - b. Other _____
3. **Fees**

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed. The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 19-0131

 - i. RCE fee required under 37 CFR 1.17(e)
 - ii. Extension of time fee (37 CFR 1.136 and 1.17)
 - iii. Other _____
 - b. Check in the amount of \$ _____ enclosed
 - c. Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type)	Robert D. Watson	Registration No. (Attorney/Agent)	45,804
Signature	<u>Robert D. Watson</u>	Date	<u>09/27/2003</u>

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Name (Print/Type)	Robert D. WATSON	Date	<u>09-25-2003</u>
Signature	<u>Robert D. Watson</u>	Date	<u>09-25-2003</u>

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including the gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL FOR FY 2003

Patent fees are subject to annual revision.
Small Entity payments must be supported by a small entity statement.
Otherwise large entity fees must be paid. See Form PTO/SB/09-12.

TOTAL AMOUNT OF PAYMENT (\$)
1680.

Complete if Known

Application Number	09/955,722	
Filing Date	09/18/2001	
First Named Inventor	Peterson	
Examiner Name	Eugent LEE	
Group / Art Unit	2815	
Attorney Docket No.	SD-6436.1	

METHOD OF PAYMENT (check one)

The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number **19-0131**

Deposit Account Name **Sandia Laboratories**

Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

2. Payment Enclosed:

Check Money Order Other

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051	130	2051 66 Surcharge - late filing fee or cash	
1052	50	2052 25 Surcharge - late provisional filing fee cover sheet	
1053	130	Non-English specification	
1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840	Requesting publication of SIR after Examiner action	
1251	110	2251 55 Extension for reply within first month	
1252	410	2252 205 Extension for reply within second month	
1253	930	2253 465 Extension for reply within third month	930
1254	1,450	2254 725 Extension for reply within fourth month	
1255	1,970	2255 885 Extension for reply within fifth month	
1401	320	2401 180 Notice of Appeal	
1402	320	2402 180 Filing a brief in support of an appeal	
1403	280	2403 140 Request for oral hearing	
1451	1,510	Petition to institute a public use proceeding	
1452	110	2452 55 Petition to revive - unavoidable	
1453	1,300	2453 650 Petition to revive - unintentional	
1501	1,300	2501 645 Utility issue fee (or reissue)	
1502	470	2502 235 Design issue fee	
1503	630	2503 315 Plant issue fee	
1460	130	Petitions to the Commissioner	
1806	180	Submission of Information Disclosure Stmt	
1809	750	2809 375 Filing a submission after final rejection (37 CFR 1.129(a))	
1810	750	2810 375 For each additional invention to be examined (see 37 CFR 1.129(b))	
		Other fee (specify) <u>Request for Continuing Exam.</u>	750
		Other fee (specify)	

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)
1680

SUBMITTED BY

Typed or Printed Name	Robert D. Watson		Complete (if applicable)
Signature	Robert D. Watson	Date 09/24/03	Reg. Number 45,604
			Deposit Account User ID 19-0131

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

TO: Examiner Eugene Le
Fax No. : 703-872-9319
FROM : Robert D. Watson, # 45,604
Sandia National Laboratories
(505) 845-3139 (Voice)

0
OFFICIAL

Applicant : Peterson
Application No. 09/955,722
Subject: Reply with RCE
Docket No. : SD-6436.1
Art Unit : 2815
Date : 09/25/2003

RECEIVED
CENTRAL FAX CENTER

SEP 25 2003

Number of Pages (Including Cover Sheet) 14

Legal Notice

This FAX contains information that is legally privileged, company-confidential or proprietary, and/or otherwise exempt from disclosure under applicable law. If you are not the addressee, you are warned not to use this information for any purpose, not to make any copies or distributions, and to contact the sender immediately for the proper method of destruction or return of this FAX.

10/C

Application No. 09/955,722
SD-6436.1 S-97675

Application No. **09/955,722**
Applicant: **Peterson**
Title: **Temporary Coating for Protection of Microelectronic Devices
During Packaging**
Filing Date: **09/18/2001**
Art Unit **2815** RECEIVED
Examiner **Eugene Lee** CENTRAL FAX CENTER
Docket No.: **SD-6436.1** SEP 25 2003

OFFICIAL

Assistant Commissioner for Patents
Box RCE
Washington DC 20231

September 25, 2003

**Request for Continuing Examination (RCE) under 37 CFR 1.114
and
Reply to the Advisory Action**

Dear Sir:

In response to the Advisory Action of 09/09/2003, applicants submit herein a Request for Continuing Examination (RCE) under 37 CFR 1.114 of the above identified application. Applicants also submit a Reply to the Advisory Action.

Applicants respectfully request that the Office reconsider the patentability of the invention in light of the arguments and amendments presented herein. Applicants submit the following in complete response thereto.

Applicants herewith petition the Assistant Commissioner of Patents under 37 CFR 1.136(a) to extend the time for reply to the Final Office dated 04/16/2003. The Office is hereby authorized to charge Deposit Account # 19-0131 for any necessary fees regarding this Reply, the Request for Continuing Examination, the petition to extend the time for reply, and any future reply(s) requiring a petition for an extension of time under 37 CFR 1.136(a).

Application No. 09/955,722
SD-6436.1 S-97675

INTRODUCTORY COMMENTS

Claim History

- Claims 1-34 were originally filed on 09/18/2001.
- In the First Amendment dated 02/03/2003:
 - claims 31-34 were cancelled in response to a restriction requirement, as being drawn to a non-elected invention;
 - claims 15 and 16 were cancelled;
 - claims 1, 10, 17, 19, 25, 28, 29 and 30 were amended; and
 - new claims 35-44 were added.
- In the Amendment after Final dated 08/12/2003:
 - claim 28 was amended (however, the amendment was not entered by the Office)
- Claims 1-14, 17-30 and 35-44 are currently pending.

CLAIM AMENDMENTS

• Please amend the Claims as follows:

1. (previously amended) A temporarily protected wafer, comprising:
a sensitive area disposed on a surface of the wafer; and
a vapor-deposited, water-insoluble temporary protective coating directly contacting
and covering the sensitive area;
wherein the protective coating is insoluble in organic solvents;
wherein the coating remains in place during singulation of the wafer into individual
device dies; and further
wherein a sufficient amount of the coating is removed to activate the sensitive area
prior to completing packaging of the die.
2. (original) The temporarily protected wafer of claim 1, wherein the sensitive area
comprises a released MEMS device.
3. (original) The temporarily protected wafer of claim 1, wherein the sensitive area
comprises a pressure-sensitive microsensor.
4. (original) The temporarily protected wafer of claim 1, wherein the sensitive area
comprises a chemically sensitive microsensor.
5. (original) The temporarily protected wafer of claim 1, wherein the sensitive area
comprises a temperature-sensitive microsensor.
6. (original) The temporarily protected wafer of claim 1, wherein the sensitive area
comprises a released iMEMS device.
7. (original) The temporarily protected wafer of claim 1, wherein the temporary
protective coating comprises a vacuum vapor-deposited coating.
8. (original) The temporarily protected wafer of claim 7, wherein the vacuum vapor-
deposited coating comprises a parylene polymer.
9. (original) The temporarily protected wafer of claim 8, wherein the parylene coating is
selected from the group of parylene polymers consisting of poly-para-xylylene,
poly-para-xylylene modified by the substitution of a chlorine atom for one

Application No. 09/955,722
SD-6436.1 S-97875

aromatic hydrogen, and poly-para-xylylene modified by the substitution of a chlorine atom for two aromatic hydrogens.

10. (previously amended) The temporarily protected wafer of claim 8, wherein the parylene coating comprises a copolymer compound formed by blending a reactive parylene monomer with a reactive material.

11. (original) The temporarily protected wafer of claim 10, wherein the reactive material comprises a monomer containing an element selected from the group consisting of silicon, carbon, and fluorine, and combinations thereof.

12. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating comprises silicon dioxide, silicate glass, or silicon nitride.

13. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating comprises a metal.

14. (original) The temporarily protected wafer of claim 13, wherein the metal comprises aluminum or tungsten.

15. (CANCELLED)

16. (CANCELLED)

17. (previously amended) The temporarily protected wafer of claim 1, wherein the temporary protective coating comprises one or more materials selected from the group consisting of a carbon film, an amorphous carbon film, and a diamond-like carbon film.

18. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating comprises a self-assembled monolayered material.

19. (previously amended) The temporarily protected wafer of claim 1, wherein the temporary protective coating comprises perfluoropolyether.

20. (original) The temporarily protected wafer of claim 1, further comprising exposed bond pads.

21. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating is deposited using a Chemical Vapor Deposition (CVD) process.

Application No. 09/955,722
SD-6436.1 S-97675

22. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating is deposited using a Plasma Enhanced Chemical Vapor Deposition (PACVD) process.
23. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating is deposited at essentially ambient temperature.
24. (original) The temporarily protected wafer of claim 1, wherein the temporary protective coating is deposited by polymerizing a monomeric gas on at least the sensitive area.
25. (previously amended) A temporarily protected die, comprising:
a sensitive area disposed on a surface of the die; and
a vapor-deposited, water-insoluble temporary protective coating directly contacting and covering the sensitive area;
wherein the protective coating is insoluble in organic solvents; and
wherein a sufficient amount of the coating is removed to activate the sensitive area prior to completing packaging of the die.
26. (original) The temporarily protected die of claim 25, wherein the sensitive area comprises a released MEMS device.
27. (original) The temporarily protected die of claim 26, wherein the temporary protective coating comprises a parylene polymer.
28. (CURRENTLY AMENDED) A temporarily protected wafer, comprising:
a sensitive area disposed on a surface of the wafer comprising a released MEMS device having a released MEMS element;
a performance-enhancing coating disposed directly on the released MEMS element; and
a vapor-deposited, water-insoluble temporary protective coating disposed directly on top of the performance-enhancing coating;
wherein the protective coating is insoluble in organic solvents; and
wherein the coating remains in place during singulation of the wafer into individual device dies, and further wherein a sufficient amount of the coating is removed to re-release the MEMS element prior to completing packaging of the die, without removing the performance-enhancing coating.

Application No. 09/955,722
SD-6436.1 S-97675

29. (previously amended) The temporarily protected wafer of claim 28, wherein the performance-enhancing coating comprises one or more materials selected from the group consisting of an anti-stiction film, an adhesion-inhibiting film, a lubricant, and a nitrided-surface.
30. (previously amended) The temporarily protected wafer of claim 28, wherein the performance-enhancing coating comprises one or more materials selected from the group consisting of perfluoropolyether, hexamethyldisilazane, and perfluorodecanoic carboxylic acid.
- 31-34. (CANCELLED)
35. (previously added) The temporarily protected wafer of claim 1, wherein the temporary protective coating is insoluble in organic solvents heated to less than or equal to 150 C.
36. (previously added) The temporarily protected wafer of claim 1, wherein the temporary protective coating is excluded from covering any wafer streets.
37. (previously added) The protected die of claim 25, wherein the die is mechanically attached and electrically interconnected to a package.
38. (previously added) The die of claim 37, wherein the sensitive area comprises a released MEMS element.
39. (previously added) The die of claim 37, wherein the die is wirebonded to the package.
40. (previously added) The die of claim 37, wherein the die is flip-chip bonded to the package.
41. (previously added) The die of claim 38, wherein the temporary protective coating is sufficiently thick so as to immobilize the released MEMS element.
42. (previously added) The die of claim 38, wherein the temporary protective coating is sufficiently thin so as to not immobilize the released MEMS element.
43. (previously added) A protected die, comprising:
 - a sensitive area disposed on a surface of the die, the area comprising a released MEMS device having a released MEMS element;
 - a performance-enhancing coating disposed directly on the released MEMS element; and

Application No. 09/955,722
SD-6436.1 S-97675

a vapor-deposited, water-insoluble temporary protective coating disposed directly on top of the performance-enhancing coating;
wherein the protective coating is insoluble in organic solvents; and
wherein the die is attached and electrically interconnected to a package.
44. (previously added) The die of claim 43, wherein the temporary protective coating is sufficiently thin so as to not immobilize the released MEMS element.

Application No. 09/955,722
SD-8436.1 S-97675

REMARKS

Status of Claims

- Claims 1-14, 17-30 and 35-44 are currently pending.

Amendments to the Claims

Applicants have amended claim 28, which includes the limitation "*wherein the protective coating is insoluble in organic solvents*".

Comments on the Previously filed Amendment after Final

Applicants submitted an Amendment after Final on 08/12/2003. Applicants desire that the same amendments and arguments presented regarding the claim rejections be re-considered in this RCE, in addition to new arguments presented below.

103 Rejections

In the Advisory Action dated 09/09/2003, the Office repeated the rejections of claims 1-14, 17-27 and 35-42 under 35 USC 103(a) as being unpatentable over Kao *et al.* in view of Wu *et al.*

Issue #1, The Office has failed to make a *prima facie* case of Obviousness.

In order to make a *prima facie* case of obviousness, the Office must show that the combination of references (Kao *et al* and Wu *et al*) teach all of the elements recited in Applicant's claims.

Kao *et al* does not teach a vapor-deposited protective layer that is insoluble in water or organic solvents, which is directly in contact with the sensitive area. Instead, Kao teaches a water soluble layer (which is not a water insoluble material) directly in contact with released MEMS structures.

Wu *et al* does not teach a vapor-deposited protective layer that is insoluble in water or organic solvents, which is directly in contact with the sensitive area. Instead, Wu teaches that the material directly in contact with the sensitive area is a thick (e.g., 10 mil) layer of a silicon elastomer (which is not a vapor-deposited material). Wu then teaches that a parylene material is then applied as a second layer on top of the silicon elastomer first layer. In Wu, the parylene second layer protects the silicon elastomer first layer from jet fuel and oil. However, Wu does not teach a parylene layer that is directly in contact with the sensitive area. Wu simply does not recognize the problem of large hydrodynamic forces applied to fragile released MEMS structures.

Application No. 09/955,722
SD-6436.1 S-97675

when liquid baths are used to remove the protective coating; *Wu* never discusses this aspect of MEMS fabrication.

Since neither *Kao* or *Wu* teach a vapor-deposited protective layer that is insoluble in water or organic solvents, which is directly in contact with the sensitive area (as recited in applicant's claims 1-14, 17-27 and 35-42) then not all of the elements are present in the combined references. Therefore, a *prima facie* case of obviousness cannot be made, and the rejections should be withdrawn.

Issue #2. The Office has failed to provide any teaching, suggestion, or motivation to make the combination of *Kao et al* with *Wu et al*.

The Office has failed to present any line of reasoning, specific understanding or principle within knowledge of a skilled artisan, or objective evidence that teaches, suggests or motivates why a person of ordinary skill in the art would make the combination of *Kao et al.* and *Wu et al.*

The Office improperly uses hindsight in choosing prior art references to combine in its 103 rejections (See MPEP 2145).

Without such a teaching, suggestion, or motivation to combine *Kao et al* with *Wu et al.*, the rejections of claims 1-14, 17-27 and 35-42 under 35 USC 103(a) is improper and should be withdrawn.

Issue #3. The references cited by the Office teach away from making the combination.

Kao teaches away from using a water insoluble material (such as parylene) as a protective layer directly in contact with released MEMS structures:

"A significant problem with use of photoresist or any other substantially water insoluble material as the protective layer is the requirement of a post saw clean[ing] operation using environmentally unfriendly solvents (i.e., acetone) to remove the protective layer from the surface of the wafer and associated microelectromechanical systems".

(See *Kao et al.*, Col. 1, lines 56-65)

Kao's solution to this problem (*which is the gist of his invention*) is to use a water soluble protective layer that is directly in contact with the MEMS structures, so that undesirable solvents (like acetone) don't need to be used when removing the temporary coating; all that is needed is a simple water bath. *Kao* simply does not recognize the problem of large hydrodynamic forces applied to fragile, released MEMS structures when using liquids (i.e., water) to remove the protective coating.

Claims 1-14, 17-27 and 35-42 require that the protective coating directly in contact with the sensitive area be water insoluble. *Kao* clearly teaches away from this.

Application No. 09/955,722
SD-6436.1 S-97675

It is improper to combine these two references when the references themselves teach away from their combination (See MPEP 2145.X.D2). Accordingly, the rejections are improper and should be withdrawn.

Rejection of Claims 28-30 and 43-44 under 35 USC 103(a)

The office rejected claims 28-30 and 43-44 under 35 USC 103(a) as being unpatentable over Kao et al. in view of Smith et al.

In response, applicants have amended claim 28 to recite, *inter alia*, a limitation that the protective coating is insoluble in organic solvents. Claim 43 includes the same limitation.

As admitted by the Office, Kao et al. does not teach that the protective coating directly in contact with the sensitive area is insoluble in organic solvents. Since neither Kao et al. nor Smith et al., either alone or in combination, teach all of the limitations of claims 28 and 43, a *prima facie* case of obviousness cannot be made, and, hence, the rejections should be withdrawn.

Accordingly, claims 28 and 43 are now in condition for allowance.

Claims 29-30 depend from claim 28. As presented above, claim 28 is now in condition for allowance. All claims depending from an allowed claim are allowable. Therefore, claims 29-30 are now in condition for allowance.

Claim 44 depends from claim 43. As presented above, claim 43 is now in condition for allowance. All claims depending from an allowed claim are allowable. Therefore, claim 44 is now in condition for allowance.

Application No. 09/955,722
SD-6438.1 S-97675

CONCLUSION

Applicants have responded to each and every objection and rejection, and urge that claims 1-14, 17-30 and 35-44 as presented are now in condition for allowance. Applicants request expeditious processing to issuance.

Respectfully submitted,

RECEIVED
CENTRAL FAX CENTER

SEP 25 2003

OFFICIAL

Robert D. Watson

Robert D. Watson
Agent for Applicants
Reg. No. 45,604
Ph: (505) 845-3139
Fax: (505) 844-1418
e-mail: rdwatso@sandia.gov
Sandia National Laboratories
P.O. Box 5800 MS-0161
Albuquerque, NM 87185-0161

Certificate of Transmission under 37 CFR 1.10

I hereby certify that this correspondence was transmitted via facsimile to the U.S. Patent and Trademark Office at phone no. 703-872-9319 on
09/25/2003 (date).

Robert D. Watson

Robert D. Watson